

PRELIMINARY LISTS OF NEW ENGLAND
PLANTS,—XIII. JUNCACEAE.¹

M. L. FERNALD.

[The sign + indicates that an herbarium specimen has been seen; the sign — that a reliable printed record has been found.]

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
<i>Juncus acuminatus</i> , Michx.	+	+		+	+	+
“ <i>alpinus</i> , Villars	+		+			
“ “ var. <i>insignis</i> , Fries	+		+			
“ <i>articulatus</i> , L.	+	+	+	+	+	+
“ “ var. <i>obtusatus</i> , Engelm.	+	+	+	+	+	+
“ <i>balticus</i> , Dethard	+	+		+		
“ <i>brachycarpus</i> , Engelm				+		+
“ <i>brachycephalus</i> , Buchenau	+		+	+		+
“ <i>brevicaudatus</i> , Fernald	+	+	+	+	+	+
“ <i>bufonius</i> , L.	+	+	+	+	+	+
“ “ var. <i>congestus</i> , Wahl.	+					
“ “ var. <i>halophilus</i> , Buchenau & Fernald	+			+		
“ <i>canadensis</i> , J. Gay	+	+	+	+	+	+
“ “ var. <i>subcaudatus</i> , Engelm.						+
“ <i>debilis</i> , Gray						+
“ <i>dichotomus</i> , Ell.				+		+
“ <i>Dudleyi</i> , Wiegand	+	+	+	+	+	+
“ <i>effusus</i> , L.	+	+	+	+	+	+
“ “ var. <i>compactus</i> , Lejeune & Courtois	+			+		
“ <i>filiformis</i> , L.	+	+	+	+		
“ <i>Gerardi</i> , Loisel	+	+	+	+	+	+
“ <i>Greenii</i> , Oakes & Tuckerman	+	+	+	+	+	+
“ <i>marginatus</i> , Rostk.	+	+	+	+	+	+
“ <i>militaris</i> , Bigelow	+			+	+	+
“ <i>nodosus</i> , L.	+	+	+	—		+
“ <i>oronensis</i> , Fernald	+					
“ <i>pelocarpus</i> , E. Meyer	+	+	+	+	+	+
“ <i>secundus</i> , Beauv.	+		+	+	+	+
“ <i>stygius</i> , L., var. <i>americanus</i> , Buchenau	+					
“ <i>subtilis</i> , E. Meyer	+					

¹ Printed in RHODORA as supplementary material.

	Me.	N. H.	Vt.	Mass.	R. I.	Conn.
<i>Juncus tenuis</i> , Willd.	+	+	+	+	+	+
“ “ var. <i>anthelatus</i> , Wiegand	+			+		+
“ “ var. <i>Williamsii</i> , Fernald	+	+	+	+	+	+
“ <i>Torreyi</i> , Coville				+		
“ <i>trifidus</i> , L.	+	+	+			
“ <i>Vaseyi</i> , Engelm.	+					
<i>Luzula campestris</i> , DC., var. <i>frigida</i> , Buchenau .	+					
“ “ var. <i>multiflora</i> , Celakovsky	+	+	+	+	+	+
“ <i>confusa</i> , Lindeberg	+	+				
“ <i>parviflora</i> , Desv.	+	+	+	+		
“ <i>saltuensis</i> , Fernald	+	+	+	+		+
“ <i>spicata</i> , Desv.	+	+	+			

NOTES UPON THE ABOVE LIST.

Juncus alpinus, Villars, with castaneous capsules, is the characteristic plant of the Gulf of St. Lawrence and extends locally southward to the St. John valley in Maine and to Willoughby Lake, Vermont. *J. alpinus*, var. *insignis*, Fries, the commoner plant of the St. John and Kennebec valleys and occurring locally on Lake Champlain, has pale capsules and is usually a larger plant. Both forms occur in northern Europe.

Juncus articulatus, L. The typical form has brown flowers, the castaneous capsules 3–4 mm. long, gradually tapering to the mucronate tip. Var. *obtusatus*, Engelm., with greenish or greenish brown flowers, the pale capsules 2.5–3 mm. long and abruptly mucronate, often replaces it in brackish or alkaline situations, and on the coast is occasionally found in salt-marshes.

JUNCUS brevicaudatus. *J. canadensis*, var. *brevicaudatus*, Engelm., Trans. St. Louis Acad. ii. (1866) 436; var. *coarctatus*, Engelm. l. c. ii. (1868) 474. This northern plant has long seemed to the writer to be unfortunately treated as a form of the essentially southern and, in New England, mostly coastal *J. canadensis*. A detailed examination of the great mass of material now accumulated by the Gray Herbarium and the New England Botanical Club indicates several important points of distinction and confirms the long established conviction, which has been shared by others who know the two plants in the field.

Juncus canadensis is a stout plant with the inflorescence (when well developed) ovoid or broader in outline, at most one-third longer than broad, the branches spreading or subascending; the glomerules

are densely many-flowered, the perianth-segments awl-pointed, equalling or slightly shorter than the abruptly short-pointed capsules; and the seeds are 1 to 1.8 mm. long. *J. brevicaudatus* is a slender plant with the inflorescence elongate, strict, and narrow, three to six times longer than broad; the glomerules are 3-7-flowered, the outer perianth-segments (sepals) acute, but scarcely awl-pointed, the inner (petals) acute or obtusish, and much shorter than the prismatic gradually pointed capsules; and the seeds are very rarely more than 1 mm. long. Furthermore *J. canadensis*, which occurs in marshes, swampy meadows, and on wet shores, is commonest on the coastal plain from southern Newfoundland to Louisiana, and on the upper St. Lawrence and the Great Lakes, though it is occasionally found at other inland stations. Its average fruiting season is in early September, fruited (but not over ripe) material from 40 stations showing a range from August 12 to October 8 with an average of September 9. *J. brevicaudatus*, on the other hand, abounds in damp open soil, roadsides, ditches, wet rocks, shores, etc., from Newfoundland to the upper Saguenay, west to Minnesota, and south, mostly in cold bogs, to the mountains of Pennsylvania. Its fruiting season is four weeks earlier in the same region than that of *J. canadensis*, mature specimens from 54 stations showing a range from July 16 to September 9, with an average of August 12. In view of these marked differences the writer feels justified in treating the strict northern plant as a distinct species.

Juncus effusus, var. *compactus*, Lejeune & Courtois, Compend. Fl. Belg. ii. (1831) 23, with inflorescence glomerulate, has passed in America as *J. effusus*, var. *conglomeratus*, Meyer (*J. conglomeratus*, L. *J. Leersii*, Marsson) which is a distinct species of Europe, known also in America from Newfoundland and Nova Scotia. *J. effusus*, var. *compactus*, is the common form of the species in Cape Breton and Nova Scotia proper and occurs frequently in eastern Maine, but is apparently unusual southward.

JUNCUS (POIOPHYLLI) oronensis. Perennis dense caespitosus. Caules erecti stricti pallide straminei vel flavo-virides 3-6 dm. alti. Folia basilaria; vagina pallide fusca vel rosea; auriculae membranaceae vel fere scariosae; lamina gracillima firma valde involuta 1-2 dm. longa. Inflorescentia subdichotoma 2.5-9 cm. longa 1-4 cm. diametro; rami stricti suberecti, flores plerumque secundi distincte distantes vel rarius approximati et umbellulati. Bractea erecta inflorescentiam multo superans. Flores 4-5 mm. longi pallide straminei. Tepala lanceolato-subulata marginibus angustis membranaceis vel omnia subaequilonga vel tria interna paullo breviora. Stamina 6 tepalis $\frac{1}{2}$ breviora; filamenta linearia; antherae lineares filamenta aequantes. Fructus tepalis brevior oblongus trigonus truncato-emarginatus lateribus planis vel prope apicem paullo concavis;

stigmata sessilia vel subsessilia. Semina 1 mm. longa circa 0.2 mm. diametro sigmoideo-fusiforma basi et apice albo-caudata, caudis quam nucleus fuscus ter brevioribus, longitudinaliter circa 15-costata reticulata.—Hab. in paludibus sphagnosis. Orono et Rangeley, Maine.

Perennial, densely caespitose. The stiff erect culms 3–6 dm. high, pale straw-color or yellow-green. Leaves mostly basal; the sheaths pale brown or pinkish, with membranous or almost scarious auricles; the blades very slender, firm, strongly involute, 1–2 dm. long. Inflorescences usually much overtopped by the erect bracts, subdichotomous, 2.5–9 cm. long, 1–4 cm. in diameter; the flowers mostly secund and distinct along the strict suberect branches, rarely umbellulate. Flowers 4–5 mm. long, pale straw-color, the lance-subulate segments firm, with narrow membranous margins, subequal or the inner slightly shorter. Stamens half as long as the perianth-segments; the linear anthers equalling the slender filaments. Capsule shorter than the perianth, oblong, trigonous, truncate-emarginate; the sides flat or a little concave toward the tip; stigmas sessile or subsessile. Seeds 1 mm. long, about 0.2 mm. thick, sigmoid-fusiform, white-caudate at base and apex, the tails one-fourth as long as the brown body, longitudinally about 15-ribbed, reticulate.—MAINE, swamp with *J. Vaseyi* and *J. tenuis*, var. *anthelatus*, Orono, August 13, 1890, July 21, 1892 — no. 300, distributed as *J. dichotomus*, **type** (*M. L. Fernald*); Rangeley, 1882 (*Kate Furbish*).—This plant has long been a perplexing one. At Orono, where it abounds in a dry sphagnum-carpeted remnant of a larch- and alder-swamp, it is mixed with the characteristic northern *J. Vaseyi* and *J. tenuis*, var. *anthelatus*, and when first found it was very immature. From this immature material, with its strongly involute firm leaves, the plant was referred by a student of the genus to whom it was shown to *J. dichotomus* of the southern coastal plain. In 1892 excellent fruiting material was collected, and without further examination placed with that of earlier date. The plant seemed in some points so unlike *J. dichotomus* that Dr. K. M. Wiegand, when studying the group for his recent valuable synopsis¹ was unwilling to leave it with that species, but, as indicated on the herbarium sheets and in a letter to the collector, he preferred to consider it a doubtful form as nearly allied to his *J. tenuis*, var. *anthelatus*. Recently, in overhauling some specimens collected in 1882 by Miss Kate Furbish at the Rangeley Lakes, far above the level in Maine of the coastal plain, the writer was surprised to find mixed with good *J. Vaseyi* fruiting material of the plant which at Orono is associated with *J. Vaseyi* and which now proves to be a species quite unlike either *J. dichotomus* or *J. tenuis*. In both those species the capsules are ovoid or obovoid, rounded to the mucronate tip, and with rounded or convex sides; the tiny oblong seeds (0.3–0.4 mm. long) are bluntly apiculate; and the anthers are distinctly shorter than the fila-

¹ Wiegand, Bull. Torr. Cl. xxvii (1900) 511–527.

ments. In *J. oronensis*, on the other hand, the capsule is oblong, truncate-emarginate, at most mucronulate, the sides flat or at tips concave; the larger spindle-shaped seeds have distinct white caudate appendages; and the anthers equal the filaments. These characters place the plant very near the northern *J. Vaseyi*, but from that it is clearly distinct in its elongate subdichotomous inflorescence, long bracts, capsule shorter than the perianth, and in the short caudate seeds, those of *J. Vaseyi* having the tails more than half as long as the dark body.

Juncus Torreyi, Coville. The only New England station known is along a railway ditch at Chelsea, Massachusetts, found by Mr. W. P. Rich¹ in 1901. The species is ordinarily of inland distribution, from western New York and adjacent Pennsylvania westward, and it is probable that the Chelsea plant is of recent introduction.

Luzula campestris, DC., in its typical form, a loosely caespitose and strongly stoloniferous plant with 2-6 large (6-7 mm. thick) castaneous spikes on wide-spreading or decurved peduncles, seems to be confined to northern Europe. Its common representative in America, as in parts of Europe and Asia, is var. *multiflora*, Celakovsky, Prod. Fl. Böhmen (1869) 85 (*L. multiflora*, Lejeune), densely caespitose, with the 3 to 12 subglobose or oblong ferruginous or pale brown (greenish in deep shade) spikes on mostly ascending peduncles. Var. *frigida*, Buchenau, Oest. Bot. Zeitsch. xlviii. (1898) 284, with very short peduncles and subglomerulate dark brown to nigrescent spikes, occurs from Greenland to Newfoundland, and reaches our district in northern and eastern Maine.

JUNCUS BUFONIUS AND ITS REPRESENTATIVES IN AMERICA.

During the summer of 1902 members of the New England Botanical Club who botanized on the coast of eastern Maine and the Maritime Provinces were much interested in the variations of *Juncus bufonius*, and particularly in its behavior upon the salt marshes and below the limit of high tide. Abundant material was secured and during the following winter the writer undertook a study of the species. The results of this study were the decision that in North America we have not only true *Juncus bufonius* with certain well marked varieties and a number of trivial forms, but that in the western districts, from the Rocky Mountains to California, etc., much which has passed as *J. bufonius* is the well-known Old World species, *J. sphaerocarpus*. In order to verify his conclusions the writer sent materials and notes to the distinguished specialist on the *Juncaceae*, Prof. Franz Buchenau of Bremen, and after a detailed correspondence and a study of much material, generously augmented by critical specimens from Prof. Buchenau, he presents the following treatment of *J. bufonius* and its allies as known to him in North America.

¹ See RHODORA, iv. 170.

* Capsule trigonous, oblong to ovoid, 3 to 4.5 mm. long, in maturity rather closely embraced by the ascending perianth.

J. BUFONIUS, L. Sp. (1753) 328. Perianth-segments all acute or subulate-attenuate, longer than the capsule, the inner (petals) slightly shorter than the outer. Seeds ovoid, apiculate at base and apex. Plant varying greatly in size and habit, 0.3 to 3.5 dm. high, erect or matted, subsimple to freely branched; the flowers mostly scattered and secund on the elongate branches, occasionally "viviparous." — Damp open soil, roadsides, ditches, etc., nearly cosmopolitan.

Var. **CONGESTUS**, Wahlb. Fl. Goth. (1820) 38. Flowers similar, mostly aggregated in glomerules.—*J. Congdoni*, Watson, Proc. Am. Acad. xxii. (1887) 480; and various other synonyms (see Buchenau, Mon. Junc. 176).—Rather unusual in North America. Examined from MAINE, North Lubec (*Kate Furbish*): SOUTH CAROLINA, Sullivan's Island (*Ravenel*): TEXAS, Galveston (*Lindheimer*): CALIFORNIA, Mariposa and San Mateo Counties (*Congdon*).

Var. **halophilus**, Buchenau et Fernald, var. nov. Flores ultimi saepe approximati. Tepala externa acuta acutata vel subulato-acutata fructu fere semper longiora, interna breviora obtusa vel rotundato-obtusa interdum mucronata fructum subaequantia (vel paullo longiora breviorave). Semina apice truncata.—Hab. in locis salsis. Quebec, Prince Edward Island, Maine, Massachusetts; Germany, Sicily.

Formae intermediae *Juncus bufonii* (genuini) et var. *halophili* haud raro occurrunt, praecipue in locis salsis. Pro exemplo: *J. ranarius*, A. Sonjeon et E. Perrier (Billot, Annotations, 1859, 192) tepala interna fructum subaequantia vel paullo superantia¹ acuta vel obtusa et semina ovoidea praebet.

Ultimate flowers usually approximate. Outer perianth-segments acute, acutish, or subulate-acute, usually equalling or exceeding the capsule; inner segments (petals) shorter, obtuse or rounded, rarely mucronate, shorter than or barely equalling the capsule. Seeds truncate at apex.—Wet, usually brackish or alkaline soil. QUEBEC, marshes, Rivière du Loup, Aug. 15, 1892 (*G. G. Kennedy*), August 2, 1902, **type** (*E. F. Williams & M. L. Fernald*), Aug. 8, 1902, (*J. R. Churchill, W. W. Eggleston, M. L. Fernald*); brackish shore, New Carlisle, July 28, 1902, mouth of Bonaventure River, July 31, 1902 (*E. F. Williams & M. L. Fernald*): PRINCE EDWARD ISLAND, above the beach, Summerside, July 21, 1901, and bog, Tracadie Beach, July 30, 1901 (*J. R. Churchill*): MAINE, salt marshes, Cutler, July 4 and 7, 1902 (*G. G. Kennedy, E. F. Williams, J. F. Collins, & M. L. Fernald*): MASSACHUSETTS, Plum Island, New-

¹"Divisions du périgone . . . les trois extérieures acuminées, subulées, dressées . . . égalant la capsule ou la dépassant à peine, les intérieures plus largement scarieuses et moins roulées sur les bords, plus ou moins aiguës et un peu plus courtes que la capsule mûre" . . . Sonjeon et Perrier, l. c.

buryport (*Wm. Oakes*): GERMANY, Nienburg an der Weser, 1859 (*Nöldaka*); Weimar, August 22, 1888 (*Torges*): SICILY, Porto Empedocle, Girgenti, May 30, 1885, Paterno, Catania, June 2, 1885 (*W. O. Focke*).—A strongly marked extreme, in its best development, with its broad blunt short inner perianth-segments and short truncate seeds, seeming very distinct from true *J. bufonius*, but clearly connected with that common species by specimens from various regions. Thus *J. ranarius*, A. Sonjeon and E. Perrier, described from borders of salt water near Moûtiers, Savoie, has the inner segments thin and barely equalling or rarely exceeding the capsule, acute or obtuse, and the seeds ovoid. Other plants showing transitional tendencies in the perianth or in the shortening of the seed have been examined from such extreme regions as Lapland, South Australia, and Manitoba, so that it is probable that *J. bufonius*, var. *halophilus* is broadly distributed over the globe.

* * Capsule subspherical or short-ovoid, 2 to 3 mm. long: perianth-segments in maturity with loosely spreading-ascending or subsquarrose tips.

J. SPHAEROCARPUS, Nees in Funck's Correspondenz, Flora (1818) 521. Resembling *J. bufonius*, but very slender, rarely 2 dm. high: quickly distinguished by its small capsules and loosely ascending perianth-segments.—A well-known species of central and southern Europe and Asia. The following American specimens have been examined. ROCKY MOUNTAINS, without station cited (*Hall & Harbour*, no. 559, in part): IDAHO, common in wet places, valley of Big Potlatch River, Nez Perces County, June 4, 1892 (*Sandberg, MacDougal & Heller*, no. 312). OREGON, Swan Lake Valley, Klamath County, June 6, 1895 (*Applegate* no. 751, in part): CALIFORNIA, margin of pool, Mendocino City, May, 1866 (*Bolander*—material distributed in Engelmänn's Herb. Junc. Bor.-Am. Norm., no. 28, as "*J. bufonius forma erecta sepalis subaequalibus capsulam retusam longe superantibus*"); Woodland, April 15, 1893 (*Blankinship*); Sisson, Siskiyou County, June, 1897 (*H. E. Brown*, no. 346); Chico, 1885 (*A. Gray*); San Isabel, May, 1852 (*Thurber*, no. 620). ARIZONA, vicinity of Flagstaff, alt. 7000 ft., July 8, 1898 (*MacDougal*, no. 241).

SUGGESTIONS FOR SPECIAL OBSERVATIONS.

Juncus balticus, Dethard, ordinarily a companion of *J. Gerardi* along the coast, is common on ledgy and gravelly river-banks of Aroostook County, Maine, with *J. alpinus*, var. *insignis*, *J. brachycephalus*, *Tofieldia glutinosa*, etc., and in an inland swamp of Genesee County, New York, with *Scirpus Torreyi*, *Zygadenus chloranthus*, etc. It should, therefore, be expected to accompany some of those characteristic species in the Champlain Valley.

Juncus brachycarpus, Engelm., found locally on the coast of New Haven County, Connecticut, and of Plymouth County, Massachusetts, will possibly be found in light soil near the coast of Rhode Island.

Juncus bulbosus, L., similar to *J. subtilis*, but with more numerous flowers in glomerules and blunt capsules, occurs in water and in boggy places in Labrador, Newfoundland, and on Sable Island, Nova Scotia, and should be sought on our northern borders.

Juncus castaneus, J. E. Smith, found on Newfoundland and Anticosti, and common on the northern Rocky Mountains, may yet be discovered on the mountains of northern New England.

Juncus conglomeratus, L. (*J. Leersii*, Marsson) similar to *J. effusus*, var. *compactus*, but with more rigid costate scapes, and with capsules tipped by a crown-like blunt mucro, occurs in southern Newfoundland and Nova Scotia and possibly reaches eastern Maine.

Juncus dichotomus, Ell., known near the coast of Connecticut and of Massachusetts, is to be sought in Rhode Island.

Juncus oronensis, Fernald, occurs on Rangeley Lake, Maine, and is probably in damp thickets or swamps of Coos County, New Hampshire.

Juncus scirpoides, Lam., has been reported from various New England stations, but all the specimens seen by the writer have proved to be other species. It occurs, however, along the coast from Florida to Long Island, and may well be expected to extend northward to Cape Cod.

Juncus stygius, var. *americanus*, Buchenau, one of the rarest and most evasive of American rushes, has been known in bogs of Somerset County, Maine, and Jefferson County, New York. It may, therefore, be hopefully sought in northern New Hampshire and Vermont.

Juncus trifidus, var. *monanthus*, Bluff & Fingerhuth, Compend. Fl. Germ. sect. i. (1825) 440, with the numerous basal leaves equalling the slender culms (2.5–6 dm. high) occurs locally along the mountains from Ulster County, New York, to Virginia and North Carolina, and should be looked for in New England, especially in Litchfield County, Connecticut, and Berkshire County, Massachusetts.

Juncus Vaseyi Engelm., found locally near the Rangeley Lakes, and in the Penobscot and St. John valleys, Maine, and in the valley of the Black River, Jefferson County, New York, is to be expected in northern New Hampshire and Vermont.

THE BLACK SPRUCE IN RHODE ISLAND.—In 1888 Mr. J. L. Bennett recorded¹ *Picea nigra*, Link, as occurring in "Johnston, Foster, etc." Apparently no specimens were preserved by him to corroborate this statement and as a result certain botanists have been somewhat skept-

¹ Plants of Rhode Island (1888), p. 40.